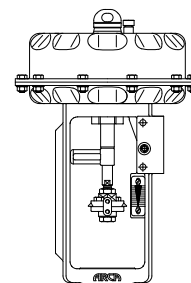


# Technical Data Sheet

## pneum. Multi-Spring-Actuator



TD\_812

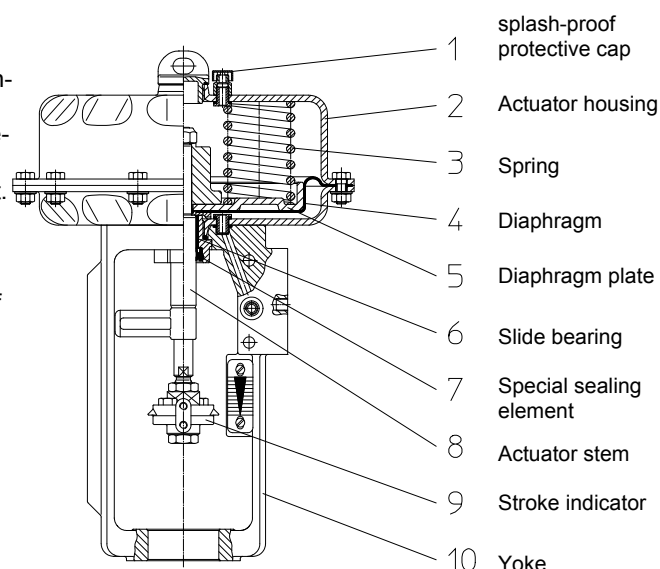
### General Data

|                                  |                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Series</b>                    | 812                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Diaphragm effective area</b>  | MFI: 320 cm <sup>2</sup> / MFIII: 720 cm <sup>2</sup>                                                                                                                                                                                                                                                                                                                       |
| <b>Stroke</b>                    | 20 - 60 mm                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Control signal</b>            | 6 bar max.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Materials</b>                 | Actuator housing: 1.0332 powder coated (option: stainless steel 1.4301)<br>Diaphragm plate: MFI-1.0332 galvanized, MFIII-1.0037 galvanized<br>Yoke: 1.6220 (option: stainless steel 1.4308)<br>Stem: 1.4122 (option: Duplex 1.4462)<br>Springs: 1.1230 plastic-covered<br>Diaphragm: NBR fabric-reinforced (moulded)<br>Sealing element: high-quality, special polyurethane |
| <b>Spring chamber</b>            | Optionally with instrument air purge                                                                                                                                                                                                                                                                                                                                        |
| <b>Operating temperature</b>     | -20°C to +80°C (Option -40°C to + 80°C)                                                                                                                                                                                                                                                                                                                                     |
| <b>No. of springs</b>            | MFI: 3-7 / MFIII: 3-12                                                                                                                                                                                                                                                                                                                                                      |
| <b>Air connections</b>           | Connection Z1: G $\frac{1}{8}$ ; Connection Z2: MFI: G $\frac{1}{8}$ / MFIII: G $\frac{1}{4}$                                                                                                                                                                                                                                                                               |
| <b>Control force spring max.</b> | 4,8 – 22 kN                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Control force air max.</b>    | 14,4 – 35,2 kN                                                                                                                                                                                                                                                                                                                                                              |

### Functional description

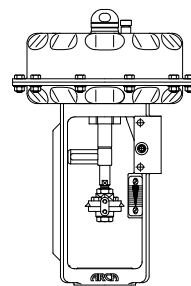
The ARCAPAQ® is a pneumatic multi-spring diaphragm actuator with spring return (fail safe) and is used to actuate linear valves. The actuator positions the valve plug in dependence of the signal pressure acting upon the actuator diaphragm, which in turn is controlled by a pneumatic or electro-pneumatic positioner. These actuators can be operated in the "air to open" function or with the reverse action "air to close".

- The actuator has a compact design with a low installed height. Various spring sets with different bench ranges ensure good adaptation to the particular operating conditions.
- A fabric-reinforced rolling-diaphragm ensures smooth conversion of the pneumatic signal pressure into the linear motion of the actuator stem. The diaphragm (4), supported by the diaphragm plate (5), is connected to the actuator stem (8) and separates the actuator housing (2) into pressure and spring chamber. If the force of the pneumatic signal pressure exceeds the opposing spring force (3), the actuator stem (8) moves and actuates the reciprocating valve.
- The signal pressure is routed to the diaphragm chamber via internal channels in the yoke (10). The air vent of the spring chamber is done by means of the protective cap (1), which is impermeable to splash water. Optionally the spring chamber can be purged with instrument air from the positioner either through internal channels or by outside tubing.
- The yoke (10) connects the actuator to the control valve. The actuator stem (8) is connected to the valve stem via the coupling (9), which also acts as a stroke indicator, and is securely guided in the slide bearing (6) and sealed with a special sealing element (7) with wiper ring.



# Technical Data Sheet

## pneum. Multi-Spring-Actuator



**TD\_812**

### Control forces and control ranges

**Opening function** (air to open - spring to close)

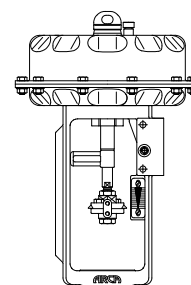
| Size        | Diaphragm surface (cm <sup>2</sup> ) | Type                   | No. of springs | Stroke (mm) | Control range |          | Control force (kN) | Force diagram (page 4) |
|-------------|--------------------------------------|------------------------|----------------|-------------|---------------|----------|--------------------|------------------------|
|             |                                      |                        |                |             | from (bar)    | to (bar) |                    |                        |
| MFI-20      | 320                                  | 812-213..<br>812-223.. | 3              | 20          | 0,75          | 1,5      | 2,4                | IA                     |
|             |                                      |                        | 6              |             | 1,5           | 3,0      | 4,8                |                        |
| MFI-20(v)   |                                      | 812-224..              | 3              |             | 1,0           | 1,5      | 3,2                | IB                     |
|             |                                      |                        | 6              |             | 2,0           | 3,0      | 6,4                |                        |
|             |                                      |                        | 7              |             | 2,3           | 3,5      | 7,4                |                        |
| MFI-30      |                                      | 812-234..              | 3              | 30          | 0,75          | 1,5      | 2,4                | II                     |
|             |                                      |                        | 6              |             | 1,5           | 3,0      | 4,8                |                        |
| MFIII-30    | 812-334..                            | 3                      | 0,7            |             | 1,5           | 5        | IIIA               |                        |
|             |                                      | 6                      | 1,5            |             | 3,0           | 10       |                    |                        |
|             |                                      | 9                      | 1,8            |             | 3,7           | 13       |                    |                        |
|             |                                      | 12                     | 2,2            |             | 4,4           | 16       |                    |                        |
| MFIII-30(v) | 812-336..                            | 3                      | 1,1            |             | 1,5           | 7,5      | IIIB               |                        |
|             |                                      | 6                      | 2,2            |             | 3,0           | 15       |                    |                        |
|             |                                      | 9                      | 2,7            |             | 3,6           | 19       |                    |                        |
|             |                                      | 12                     | 3,2            |             | 4,3           | 22       |                    |                        |
| MFIII-60    | 812-346..                            | 3                      | 60             | 0,7         | 1,5           | 5        | IV                 |                        |
|             |                                      | 6                      |                | 1,4         | 3,0           | 10       |                    |                        |
|             |                                      | 9                      |                | 1,7         | 3,6           | 12       |                    |                        |
|             |                                      | 12                     |                | 2,0         | 4,3           | 14       |                    |                        |

**Closing function** (air to close - spring to open)

| Closing function (air to close - spring to open) |                                      |                        |                |             |                           |                                                  |         |         |         |         |
|--------------------------------------------------|--------------------------------------|------------------------|----------------|-------------|---------------------------|--------------------------------------------------|---------|---------|---------|---------|
| Size                                             | Diaphragm surface (cm <sup>2</sup> ) | Type                   | No. of springs | Stroke (mm) | Control pressure min. bar | Control force (kN) depending on control pressure |         |         |         |         |
|                                                  |                                      |                        |                |             |                           | 2,0 bar                                          | 3,0 bar | 4,0 bar | 5,0 bar | 6,0 bar |
| MFI-20                                           | 320                                  | 812-213..<br>812-223.. | 3              | 20          | 1,5                       | 1,6                                              | 4,8     | 8,0     | 11,2    | 14,4    |
|                                                  |                                      |                        | 6              |             | 3,0                       | -                                                | -       | 3,2     | 6,4     | 9,6     |
| MFI-20(v)                                        |                                      | 812-224..              | 3              |             | 1,5                       | -                                                | 4,8     | 8,0     | 11,2    | 14,4    |
|                                                  |                                      |                        | 6              |             | 3,0                       | -                                                | -       | 3,2     | 6,4     | 9,6     |
|                                                  |                                      |                        | 7              |             | 3,5                       | -                                                | -       | 1,6     | 4,8     | 8,0     |
| MFI-30                                           |                                      | 812-234..              | 3              | 30          | 1,5                       | 1,6                                              | 4,8     | 8,0     | 11,2    | 14,4    |
|                                                  |                                      |                        | 6              |             | 3,0                       | -                                                | -       | 3,2     | 6,4     | 9,6     |
| MFIII-30                                         | 720                                  | 812-334..              | 3              |             | 1,5                       | 3,6                                              | 10,8    | 18      | 25,2    | 32,4    |
|                                                  |                                      |                        | 6              |             | 3,0                       | -                                                | -       | 7,2     | 14,4    | 21,6    |
|                                                  |                                      |                        | 9              |             | 3,7                       | -                                                | -       | 2,2     | 9,4     | 16,6    |
|                                                  |                                      |                        | 12             |             | 4,4                       | -                                                | -       | -       | 4,3     | 11,5    |
| MFIII-30(v)                                      |                                      | 812-336..              | 3              |             | 1,1                       | 6,4                                              | 13,6    | 20,8    | 28      | 35,2    |
|                                                  |                                      |                        | 6              |             | 2,2                       | -                                                | 5,7     | 12,9    | 20,1    | 27,3    |
|                                                  |                                      |                        | 9              |             | 2,6                       | -                                                | 2,8     | 10      | 17,2    | 24,4    |
|                                                  |                                      |                        | 12             |             | 3,1                       | -                                                | -       | 6,4     | 13,6    | 20,8    |
| MFIII-60                                         |                                      | 812-346..              | 3              | 60          | 1,5                       | 3,6                                              | 10,8    | 18      | 25,2    | 32,4    |
|                                                  |                                      |                        | 6              |             | 3,0                       | -                                                | -       | 7,2     | 14,4    | 21,6    |
|                                                  |                                      |                        | 9              |             | 3,6                       | -                                                | -       | 2,9     | 10,1    | 17,3    |
|                                                  |                                      |                        | 12             |             | 4,3                       | -                                                | -       | -       | 5,0     | 12,2    |

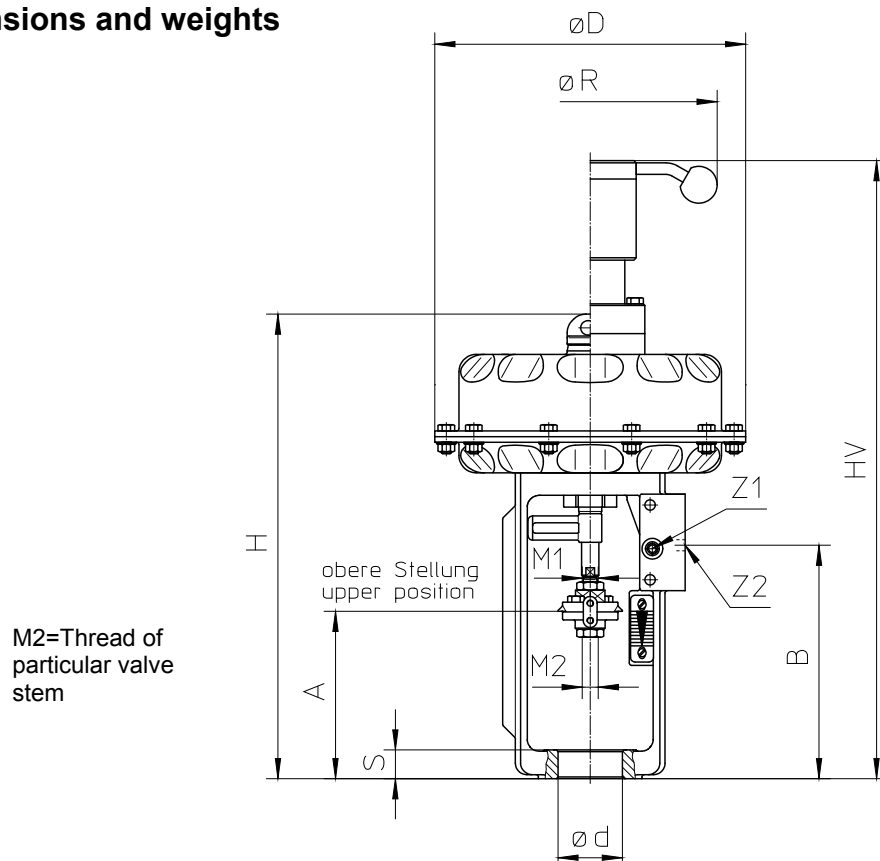
# Technical Data Sheet

## pneum. Multi-Spring-Actuator



**TD\_812**

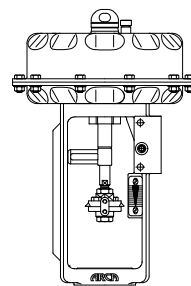
### Dimensions and weights



| Size      | Diaphragm surface (cm²) | Type      | Weight | No. of springs | Stroke (mm) | Ø D (mm) | M1 actuator | Ø d (mm) | S (mm) | A (mm) | B (mm) | H (mm)  | HV (mm) | Ø R (mm) |     |     |     |     |     |     |
|-----------|-------------------------|-----------|--------|----------------|-------------|----------|-------------|----------|--------|--------|--------|---------|---------|----------|-----|-----|-----|-----|-----|-----|
| MFI-20    | 320                     | 812-213.. | 14     | 3              | 20          | 270      | M14         | 40       | 20     | 120    | 180    | 361     | 508     | 220      |     |     |     |     |     |     |
|           |                         | 812-223.. |        | 6              |             |          |             | 48       |        |        |        |         |         |          |     |     |     |     |     |     |
|           |                         |           |        | 3              |             |          |             |          |        |        |        |         |         |          |     |     |     |     |     |     |
| MFI-20(v) |                         | 812-224.. | 6      | 20             | 48          |          |             | 20       |        |        |        | 120     | 180     |          | 381 | 528 |     |     |     |     |
|           |                         |           | 6      |                |             |          |             |          |        |        |        |         |         |          |     |     |     |     |     |     |
|           |                         |           | 7      |                |             |          |             |          |        |        |        |         |         |          |     |     |     |     |     |     |
| MFI-30    |                         | 812-234.. | 16     | 3              | 30          | 400      | M20x1,5     | 56       | 25     | 142    | 203    | 404     | 551     | 335      |     |     |     |     |     |     |
|           |                         |           | 6      |                |             |          |             |          |        |        |        |         |         |          |     |     |     |     |     |     |
|           |                         |           | 3      |                |             |          |             |          |        |        |        |         |         |          |     |     |     |     |     |     |
| MFI-30    | 720                     | 812-334.. | 40     | 3              |             |          |             |          |        |        | 400    | M20x1,5 | 56      |          | 25  | 142 | 251 | 489 | 651 | 335 |
|           |                         |           | 42     | 6              |             |          |             |          |        |        |        |         |         |          |     |     |     |     |     |     |
|           |                         |           |        | 9              |             |          |             |          |        |        |        |         |         |          |     |     |     |     |     |     |
| MFI-30(v) |                         | 812-336.. | 42     | 3              | 60          | 72       | 30          | 192      | 309    | 625    |        |         |         | 888      |     |     |     |     |     |     |
|           |                         |           | 44     | 6              |             |          |             |          |        |        |        |         |         |          |     |     |     |     |     |     |
|           |                         |           |        | 9              |             |          |             |          |        |        |        |         |         |          |     |     |     |     |     |     |
|           |                         |           | 12     | 60             | 72          | 30       | 192         | 309      | 625    | 888    |        |         |         |          |     |     |     |     |     |     |
|           |                         | 812-346.. | 45     |                |             |          |             |          |        |        | 3      |         |         |          |     |     |     |     |     |     |
|           |                         |           | 6      |                |             |          |             |          |        |        |        |         |         |          |     |     |     |     |     |     |
|           |                         |           | 47     | 9              |             |          |             |          |        |        |        |         |         |          |     |     |     |     |     |     |
|           |                         |           |        | 12             |             |          |             |          |        |        |        |         |         |          |     |     |     |     |     |     |

# Technical Data Sheet

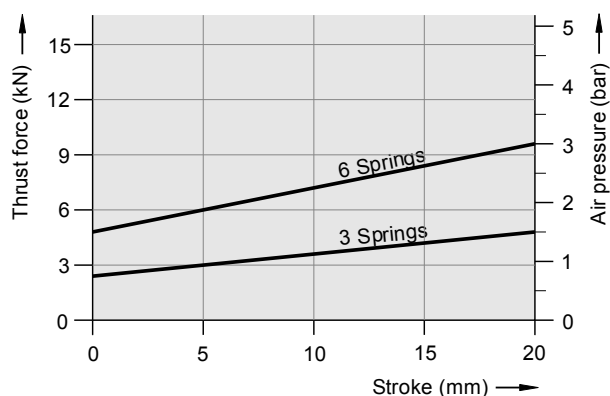
## pneum. Multi-Spring-Actuator



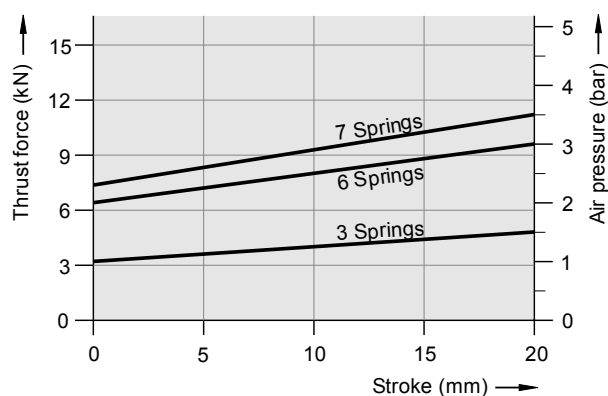
**TD\_812**

### Force diagrams

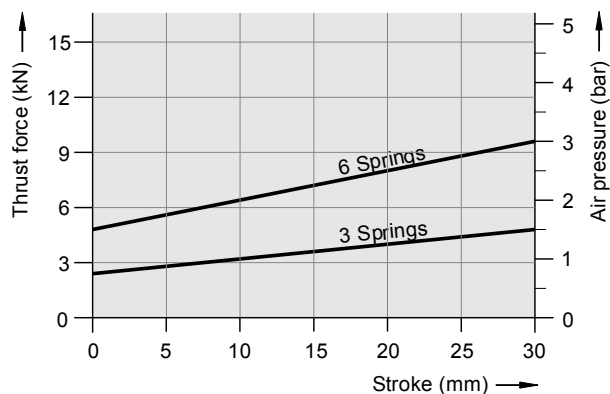
**IA MFI-20**



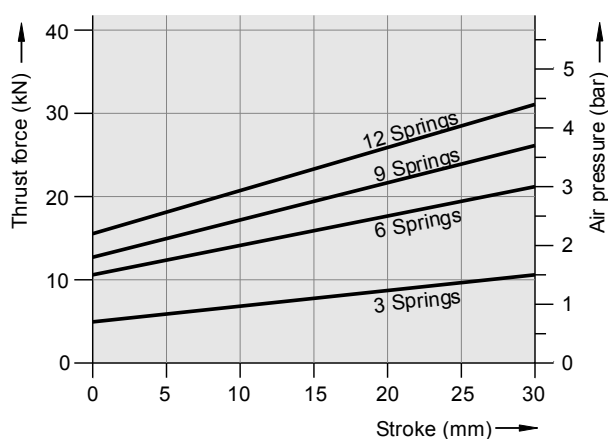
**IB MFI-20(v)**



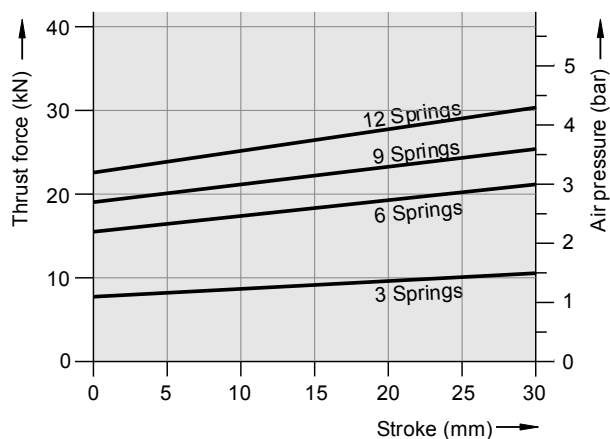
**II MFI-30**



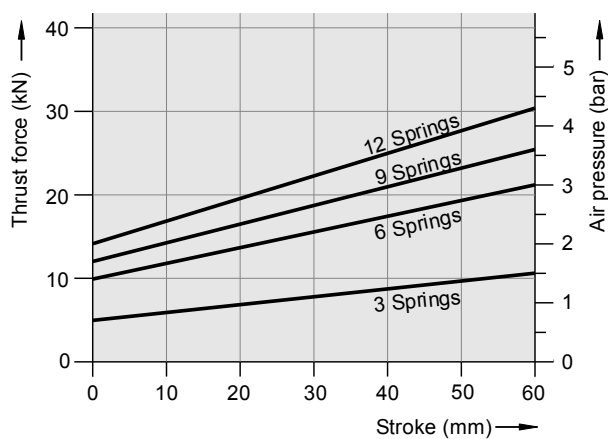
**IIIA MFIII-30**



**IIIB MFIII-30(v)**

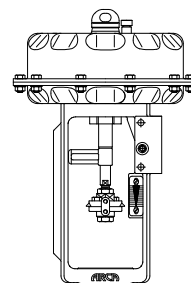


**IV MFIII-60**



# Technical Data Sheet

## pneum. Multi-Spring-Actuator



**TD\_812**

### Type code

812 -2 2 3 3 N- O B 0 -HV

#### Series

#### Actuator size

- 2 MFI diaphragm surface 320 cm<sup>2</sup>
- 3 MFIII diaphragm surface 720 cm<sup>2</sup>

#### Yoke (ø = adapter in mm)

|     |     |     |     |     |         |
|-----|-----|-----|-----|-----|---------|
| 0   | 1   | 2   | 3   | 4   | 9       |
| w/o | ø40 | ø48 | ø56 | ø72 | special |

#### Hub

|       |       |       |
|-------|-------|-------|
| 3     | 4     | 6     |
| 20 mm | 30 mm | 60 mm |

#### Spring set

3 = 3 springs    6(7) = 6(7) springs    9 = 9 springs    0 = 12 springs

#### Material of diaphragm chamber

- N = diaphragm head steel / yoke steel
- A = diaphragm head steel / yoke stainless steel
- V = diaphragm head stainless steel / yoke stainless steel

#### Function

- O = springs move the stem downwards (air to open)
- S = springs move the stem upwards (air to close)

#### Execution

- B = actuator reversible, w/o spring chamber purge
- E = actuator reversible, with integrated spring chamber purge

#### Extra equipment

- 0 = w/o
- 1 = stroke limitation in the opening direction
- 4 = low temperature -40° C
- 5 = air connection G 1/2"
- 6 = screws stainless steel (long)
- AP = outer parts in stainless steel passivated
- B = stroke limitation adjustable for both direction O/S
- FG = spring cover 180° rotated
- S = on/off actuator
- SD = stem 1.4462 (Duplex)
- VB = for VDI/VDE-mounting
- X = XYLAN circumferential screws
- Z = ASME design

#### Handwheel

- = w/o
- HV = with handwheel (can not be combined with 1 and B)